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## Entomology

### Insect Predators-Green Lacewings

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Natural enemies such as green lacewings (Neuroptera: Chrysopidae) are important for sustainable agriculture because they provide us a free service in managing and controlling unwanted insect and mite (arthropod) pests in agricultural crops in fields and greenhouses. Green lacewings are predators of many soft-bodied insects (e.g. aphids, thrips, mealybugs, soft scales, whiteflies, psyllids and small caterpillars) and mites (e.g. spider mites) and their eggs. They are called generalist predators because they feed on many different types of insect and/or mite prey. Green lacewings are considered as one of the most important predatory natural enemies of agricultural pests.



Figure 1:. Green lacewing adult. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (UGA5490404).

#### Predatory nature of larvae and adults

Larvae of all species of green lacewing are predacious. They are called “aphid lions” because of their ability to attack and kill a large number of aphids and other soft-bodied arthropods in a short period of time. Adult green lacewings of the Genus *Chrysoperla* (e.g. *Chrysoperla rufilabris*) are not carnivorous. They feed on honeydew, flower nectar and pollen. In contrast, adult green lacewings of the Genus *Chrysopa* (e.g. *Chrysopa oculata* and *Chrysopa nigricornis*) are predacious, and feed on soft-bodied insects and mites in addition to honeydew, flower nectar and pollen.

#### Adults

Adult lacewings are green in color and have golden eyes. They have two pairs of green lacelike netted wings. The body of the adult is 1/2–3/4 inch long depending on the species. They are not strong fliers and are commonly found near aphid colonies. Adults fly during night and are often attracted to night-lights. They can live approximately 30-40 days. Newly emerged adults mate and lay eggs within 4–5 days. It takes approximately one month to complete the life cycle from newly laid eggs to emergence of adults.

#### Eggs

Adult females lay their eggs as small batches on plant materials. They prefer to lay eggs among aphid colonies. Lacewing larvae are cannibalistic and attack sibling eggs and larvae. To avoid the first hatched larva/larvae attacking unhatched eggs or young larvae, females lay each egg on a long stalk. Eggs are oval in shape and approximately 0.02 inches long. Newly laid eggs are green in color and turn brown when they are matured and ready to hatch. Once eggs are hatched, egg sacs become white and remain attached to their stalks. If you see white lacewing eggs, they are probably hatched eggs.

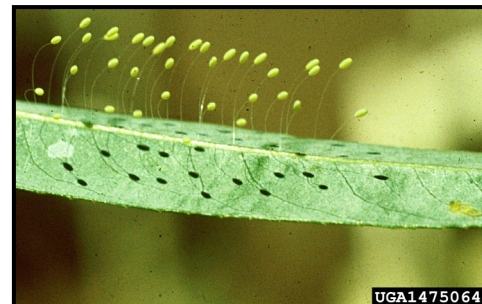


Figure 2:. Green lacewing eggs. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (UGA1475064).

## Larvae

Lacewing larvae look like tiny alligators. They are voracious predators of soft-bodied insects. Each larva has a pair of large sickle-shaped mandibles. Larva uses the mandibles to pierce the body of its prey and suck the body fluids. They are very active individuals and fast runners. The larvae can move more than 100 feet when searching for prey. There are three larval stages in lacewing lifecycle. At end of first or second larval stage, each larva sheds the old skin and become the second or third larva, respectively. At the latter part of its development, the third stage larva weaves a round silken cocoon to pupate.



Figure 3:. Green lacewing larva feeding on aphids Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (UGA5561443).

## Pupa

Lacewing pupa develops inside a woven silken cocoon and undergoes a complete transformation similar to butterflies. A fully developed winged-adult emerges from the cocoon after it cuts a circular hole on top of its cocoon.

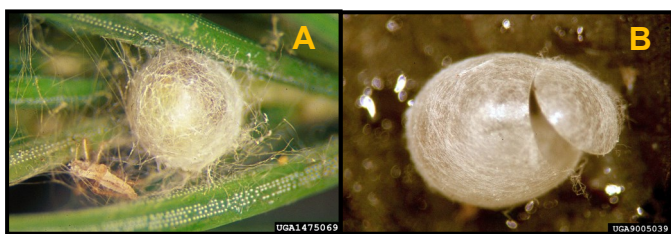


Figure 4: A. Green lacewing cocoon. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (UGA1475069), B. Green lacewing cocoon with a hole cut Photo credit: Bradley Higbee, Paramount Farming, Bugwood.org (UGA9005039).

## Green lacewing species in Tennessee

In Tennessee, we have found the green lacewing *Chrysopa oculata* in vegetables and small-fruit crops and *Chrysopa nigricornis* in peach and apple orchards. *Chrysoperla rufilabris* is also recorded in Tennessee.

## Herbs and flowering plants

Herbs and flowering plants attract green lacewings to fruit and vegetable gardens, farms and orchards.

Herbs such as cilantro, dill, parsley and fennel, and flowering plants such as cosmos, sunflower, golden marguerite, sweet alyssum and tansy are some of the plants that you can grow in your vegetable and fruit gardens to attract lacewings.

## Availability to purchase

Eggs, larvae and adults of *Chrysoperla rufilabris* are commercially available to purchase from beneficial insect rearing facilities (e.g. Beneficial Insectary [<https://www.insectary.com/>]) in the United States. It is important to have herbs and flowering plants available as an alternative food source when releasing these beneficial insects in your garden.

## Sensitivity to pesticides

Unfortunately, the use of broad-spectrum contact and systemic insecticides can disrupt populations of lacewings and other natural enemies in your garden. It is important to use integrated pest management (IPM) practices and keep insecticides as a last resort when controlling pests.

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